

BRAITENBERG SIMULATION FOR LEARNING BENCHMARKING

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Abstract

This project is an attempt to create a simple simulated environment and evaluation techniques for the purpose of observing emergent collective and individual behaviors of autonomous agents situated in vehicles. First we simulate vehicles with very simple control architectures that are essentially a discrete (digital) variety of the Braitenberg vehicle. In another case we use the stimulus to response map of the discretized Braitenberg vehicle as a training set that we apply to a 3 layer feed forward neural network by means of the back propagation of errors algorithm. The trained feed forward neural network was then tested by situating it as the executor of control in a vehicle in the artificial environment. In another case we impose competitive constraints and evolutionary operators on the discrete version of Braitenberg Vehicles. Other cases include an analog version, and recurrent and resonant neural networks. Because we implement all these cases in a single simulator we have a way to test conjectures about emergent properties of evolutionary and neural phenomena with a consistent set of evaluative tools.

Category

Session: *Computer Science*